

clearly explained in Mr. Pendlebury's book on lenses, but that does not include other parts of the subject, and is somewhat needlessly long.

The book concludes with an account of some simple optical instruments, dispersion and achromatism, and the geometrical theory of the rainbow.

OUR BOOK SHELF

New Commercial Plants and Drugs. By T. Christy, F.L.S., &c. No. 9. (London: Christy and Co., 1886.)

THIS pamphlet of 73 pages treats for the most part of medicinal products, though some consideration is also given to fodder and food-plants, essential oils, india-rubber, and various others. The first article is devoted to the Doundake (*Sarcocephalus esculentus*), a West African Rubiaceae plant, which has attracted some attention of late in cases of nervous paralysis. The root has been analysed by Messrs. Heckel and Schlagdenhauffen, and their analysis is given together with a reproduction of the two plates which accompanied their paper. Two new perfume oils come under consideration, namely, from *Eucalyptus staigeriana* and *Backhousia citriodora*. The first is a Queensland tree, and is known as the lemon-scented iron bark. The odour of the leaves is said to be exactly like that of the lemon-scented verbena, and the oil yielded by them is identical in fragrance with that from *Andropogon citratus*, or lemon-grass oil, which is imported into this country both from Ceylon and Singapore, where the plants are very extensively cultivated. Mr. Christy says that "the odour of the oil of this tree is quite different from that of *Eucalyptus citriodora*, which resembles, and might be substituted for, citronella oil, so extensively used for perfuming soap." The *Backhousia* oil is described as being like that of *Eucalyptus staigeriana*, and upon being tested for scenting soaps it was found to answer well, and would probably find a ready market in this country if it could be imported at a price to compete with ordinary verbena oil. It might realise 1s. 4d. to 2s. per pound.

The Kava root (*Piper methysticum*) of the Fiji Islands, which is so well known for the disgusting ceremonies which, in former times perhaps more than the present, accompanied its preparation, has of late years been introduced amongst us for its medicinal properties. The active principle of the Kava root appears to reside in a resinous substance extracted with alcohol. From a series of experiments it seems that this principle is a substance of very great importance as a local anæsthetic, but that in larger doses it produces a scaly affection of the skin. From the Kava root a spirit or liqueur has been distilled, and this under the name of Yagona is on sale at the refreshment bars of the present Colonial and Indian Exhibition.

Another new drug which probably has a future before it is the Kombe of Central Africa (*Strophanthus hispida* or *S. Kombe*) which has been proved to be of considerable value in affections of the heart. The first communication relating to the physiological action of this drug was made by Prof. Fraser to the Royal Society of Edinburgh in 1870, which was followed in 1885 by a more elaborate paper at the Cardiff Meeting of the British Medical Association. There seems, however, even after this lapse of time to be a difficulty in obtaining the seeds in quantity, or even the right species, several forms having been introduced from the Gold Coast, Sierra Leone, and other parts of Africa; the chief difference lies in the seed, some forms of which are covered with long, fine silky hairs.

Mr. Christy's pamphlet, like its predecessors, is a useful record of newly introduced and useful plants.

Heidelberg gefeiert von Dichtern und Denkern seit fünf Jahrhunderten. Herausgegeben von Albert Mays. (Heidelberg, 1886.)

IT was a happy thought of the compiler of this volume to collect and publish on the five hundredth anniversary of the foundation of the University of Heidelberg a selection of what has been written about the city and the University by eminent men of various nations at different periods of time. A collection of all that has been written about the ancient city and its lovely situation would, Herr Mays says, fill a respectable library, for besides histories in verse of the Palatinate and its capital there are innumerable tales, novels, and the like based on incidents in its history, and lyrical and historical poems on Heidelberg by the hundred. In making a selection from this vast mass of matter, the compiler has only retained poems or descriptions which are of special poetical or literary value, or those which are of special interest on account of the author, or, finally, those which exhibit some special originality or peculiarity. But even when thus winnowed a handy volume is left. Needless to say, the vast majority of the writers are German; there are a few English, and one American (Longfellow). The list commences with an extract from the Bull of Pope Urban VI. of October 23, 1385, authorising Prince Rupert to found the University. This is followed by extracts from over sixty authors arranged chronologically. Herr Mays notices as a curiosity that not one of these is French. The English authors naturally dwell on the castle, "next to the Alhambra of Granada the most magnificent ruin of the Middle Ages," rather more than on the University; but indeed the German writers do the same. The book will show the good people of Heidelberg, if they lack such knowledge at this festive season, that they are citizens of no mean city. It should also prove an interesting memento to many in Europe and America who have passed a few years at the most impressionable period of their lives at the old University, which, with its sister at Bonn, has of late years drawn the British student away from Göttingen.

LETTERS TO THE EDITOR

- [The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts. No notice is taken of anonymous communications.]
- [The Editor urgently requests correspondents to keep their letters as short as possible. The pressure on his space is so great that it is impossible otherwise to insure the appearance even of communications containing interesting and novel facts.]

Organic Evolution

FOR some time I have much desired to direct the attention of your readers all over the world to the two very remarkable articles on Organic Evolution, by Mr. Herbert Spencer, which appeared in the April and May numbers of the *Nineteenth Century*. I hope they will be separately published. They mark in my opinion a new departure in the Philosophy which has been built up by a certain school of writers on the Darwinian Theory. Let me explain what I mean.

From the first discussions which arose on this subject I have ventured to maintain that the successors of Darwin have run quite wild from the teaching of their master—that his Hypothesis, even if completely true so far as it went, offered no adequate explanation whatever of the multiform and complicated facts of Organic Evolution—that the phrase "natural selection" represented no true physical cause, still less the complete set of causes requisite to account for the orderly procession of organic forms in Nature; that in so far as it assumed variations to arise by accident it was not only essentially faulty and incomplete, but fundamentally erroneous; in short, that its only value lay in the convenience with which it groups under one form of words, highly charged with metaphor, an immense variety of causes, some purely mental, some purely vital, and others purely physical or mechanical.

The violence with which false interpretations were put upon this Theory and a function was assigned to it which it could never fulfil, will some day be recognised as one of the least creditable episodes in the history of science. With a curious perversity it was the weakest elements in the Theory which were seized upon as the most valuable, particularly the part assigned to blind chance in the occurrence of variations. This was valued not for its scientific truth,—for it could pretend to none,—but because of its assumed bearing upon another field of thought and the weapon it afforded for expelling Mind from among the causes of Evolution.

There have been many symptoms that this Philosophy is breaking down. Mr. Herbert Spencer, although he has worked out the consequences of Evolution with enthusiasm, has never been blind to some of its defects. His mind is too closely analytical not to be brought into contact at many points, with its manifest inapplicability and its wordy hollowness.

But in these two articles we have for the first time an avowed and definite declaration against some of the leading ideas on which the Mechanical Philosophy depends; and yet the caution, and almost the timidity, with which a man so eminent approaches the announcement of conclusions of the most self-evident truth—is a most curious proof of the Reign of Terror which had come to be established.

I cannot in this letter indicate the breadth and sweep of the admissions now made by Mr. Herbert Spencer in the two articles referred to,—fatal to the adequacy of the Mechanical Philosophy as any explanation of organic evolution. They cluster round, and follow from the central admission that “the words ‘natural selection’ do not express a cause in the physical sense.” Another great admission is that the “co-operation” which is required in the growth and development of useful parts, cannot be accidental.

Of course, now that so eminent a man as Mr. Herbert Spencer has opened his eyes and his mouth to these—and many other—admissions, we shall have all the *Dii Minores* following suit.

I have read with great pleasure an article in your last number (p. 314) on “Physiological Selection,” with an “additional suggestion on the origin of species.” I rejoice that the author has at last discovered that “natural selection has been made to pose as a theory of the origin of species, whereas in point of fact it is nothing of the kind.” This has been my contention for many years.

ARGYLL

Aurora

WITH reference to the aurora of July 27, accounts of which appear in NATURE, vol. xxxiv. pp. 311 and 312, the following particulars of the accompanying magnetic disturbance recorded here may be of interest. The disturbance commenced about 3 p.m. on July 27 with small fluctuations in declination and horizontal force, followed by larger movements which commenced sharply at 10.20 p.m. in all three elements, and continued to about 7 a.m. on July 28. The greatest movement was between 10.20 and 11.30 p.m., amounting to 45' in declination, 0.11 of the horizontal force, and .005 of the vertical force. Corresponding earth-currents were recorded as usual.

W. H. M. CHRISTIE

Royal Observatory, Greenwich, August 10

Mock Suns

KINDLY add the following, to make up for omission of my figure in your issue of July 29 (p. 289):—

The “arched eyebrows,” as I called them, can best be described thus—

Resting on the top of the halo circle, where the third mock light stood, was a bow of peculiar curve. It was like two well-arched eyebrows flowing together by a curve of gentle dip at the point where it touched the halo. Each arch was about equal to one-eighth part of the halo circle in every respect except that its centre lay about the middle of the chord joining the upper mock light with the mock light on that side of the sun. The contrariety, and the anomalous positions of the two centres of the two arches, strike me as very noteworthy. I cannot presume to guess at an explanation.

May I add that a correspondent of the *Standard* states that he too saw the white ray on the left side; and that it stretched, to use his expression, “round the sky almost to the east, and at the end of it was another mock sun much less brilliant,” where

it “seemed about to begin a fresh series of mock suns and circles.” This too seems to me too striking a feature to be lost to record in NATURE.

W. J. HERSCHEL

Littlemore, August 2

Meteors

ON August 4, 10h. 40m., a beautiful slow meteor was seen here threading its way from about 2° S. of α Ursæ Majoris to very slightly below β Aurigæ. Its light fluctuated greatly, but at its best it must have been brighter than Jupiter, though the effect was much marred by mist. The most noteworthy feature was its extreme slowness of movement; a careful determination gave 8 seconds as the time it remained in sight. There was no train of any sort; the meteor rolled along with a star-like aspect, and its velocity near the end point became so much impeded that it seemed almost stationary. I observed fifty-seven other meteors during the same night, but none of these could be associated in appearance and direction with the one specially described. Its radiant-point was probably in Ursa Major, close to β , at about $162^\circ + 59^\circ$.

On August 6, 10h. 3m., a meteor equal to Jupiter was seen pursuing a long path just south of and nearly parallel to α and ϵ Pegasi. It left a bright streak, and was a conspicuous object, notwithstanding the moonlight. The radiant-point was at about $32^\circ + 17^\circ$, nearly 6° S.S.E. of α Arietis, or possibly in the extreme east boundaries of Aries.

It would be important to hear of duplicate observations of these large meteors. In the eastern parts of England they must have appeared very bright, and being visible at a convenient hour in the evening many persons will have noticed them.

Bristol, August 9

W. F. DENNING

LAST night at about eleven o'clock a fine meteor was visible here through an opening in clouds. Its path was in Aquarius, commenced a little to the east of η , and seemed to be in the direction of a line joining η and δ . In three or four seconds the meteor passed over about 20° , and it left momentarily a trail over the last 10° . This was slightly curved, the convex side being to the east, and the colour varying from yellow for a quarter of the curve to red during the remainder. At first the meteor resembled Saturn in size and colour, then became larger, whiter, and afterwards pale blue, and when it finally disappeared behind the clouds it considerably exceeded Venus at her brightest, both in size and brilliance.

L. J. H.

Ramsey, Isle of Man, August 5

PHYSIOLOGICAL SELECTION: AN ADDITIONAL SUGGESTION ON THE ORIGIN OF SPECIES¹

II.

NEXT, let it be observed that we cannot expect to meet with much direct evidence of physiological selection from our domesticated varieties. For, first, breeders and horticulturists keep their strains separate artificially, and preserve many kinds of variation other than those of the reproductive system with which alone we are concerned; and, secondly, it is never the aim of these men to preserve this particular kind of variation. Therefore, all that we can here learn from our domesticated productions is the paramount importance of preventing intercrossing with parent forms, if a new varietal form is ever to gain a footing. No one of these domesticated varieties could have been what it now is unless such intercrossing had been systematically prevented by man; and this gives us good reason to infer that no natural species could have been what it now is unless every variety in which every species originated had been prevented from intercrossing with its parent form by nature. For the cases are extremely rare in which one species differs from another (living or extinct) in respect of any feature so highly utilitarian in character as to justify belief that the newer species owed its differentiation to natural selection having been able to overcome the swamping effects of free intercrossing.

¹ Abstract of a Paper read before the Linnean Society on May 6, by George J. Romanes, M.A., LL.D., F.R.S. &c. Continued from p. 316.